cases to localize obstructions or lesions in the different parts of the reflex arc. It is for this reason that the instrument is called the "Differential Pupilloscope." In addition it enables us to positively diagnose a "sluggish reaction" before this becomes apparent by our best clinical methods. On the other hand, in a series of 108 neurological cases, which are reported elsewhere by Dr. Mehrtens and the author, twelve cases which had clinically been diagnosed as Argyll-Robertson pupils, because of their sluggish reactions, were proved by the pupilloscope to be normal. This discrepancy between our clinical and pupilloscopic examinations is accounted for by the fact that the former are based on the arc, the amplitude, speed, etc., of the reaction. These factors obviously vary, not only according to the judgment of the individual observer, but also in themselves inasmuch as they are influenced by the structure of the iris. Thus the senile iris and sphincter are stiffer than a young one; a brown iris stiffer than a blue one. These factors do not, however, affect the reactivity as tested by our method. It is true, on the other hand, that the results obtained with the instrument require an exact ocular examination and considerable personal experience on the part of the observer.

In practice I have found the method of particular value in the following:

1. Deformed pupils, if pathological, show diminution of reactivity of part or of the whole sphincter.
2. Anisokoria. If due to pathological lesion, the reactivity is affected. In congenital cases it is normal.
3. Early diagnosis of Argyll-Robertson as well as other pupillary lesions such as iridoplegia and ophthalmoplegia interna.
4. Definite diagnosis of Argyll-Robertson pupil in presence of optic atrophy, opacities of the media, or even of synechae, so long as in the latter case a portion of the pupil is not mechanically impeded in its freedom of movement.

The value of the above is evident to any one familiar with the significance of pupillary lesions. It is a matter of general knowledge that the true Argyll-Robertson pupil (reflex iridoplegia) occurs only in neuro-syphilis. It is often isolated and may precede by many years all other signs of the disease. At the present time it is of interest to note that in encephalitis lethargica the Argyll-Robertson pupil does not occur, whereas ophthalmoplegia interna is frequent.

Lay Control of Medicine—Lay control and dictation of the management of the institutions in which medical men are interested directly or indirectly is bound to come unless something is done to prevent it. Not alone this, but lay control of everything pertaining to the practice of medicine eventually will come unless the spineless doctors who fail to see the growing tendency of the times awaken to the danger and put on their fighting clothes in an attempt to save a reasonable amount of independence for themselves. This is no idle dream, and those who think differently will have occasion to learn the truth perhaps when it is too late.—Indiana Medical Journal, September 15, 1922.

INTRA VITAM BONE MARROW PUNCTURE IN PERNICIOUS ANEMIA*

By ERNEST H. FALCONER, M. D., San Francisco and LAIRD M. MORRIS, M. D., San Francisco

Laird M. Morris has devised a small drill, carrying an outer casing and driven by a dental engine, the drill being attached to the dental engine in the same manner as an ordinary dental drill. This drill will readily penetrate the cortex of the long bones. When this is accomplished the drill proper, marked in the illustration (B) is withdrawn from the puncture wound, leaving the casing (C) in situ. Through this casing a sample of the marrow is reamed out with the screw-like instrument marked (A).

TECHNIQUE OF OPERATION

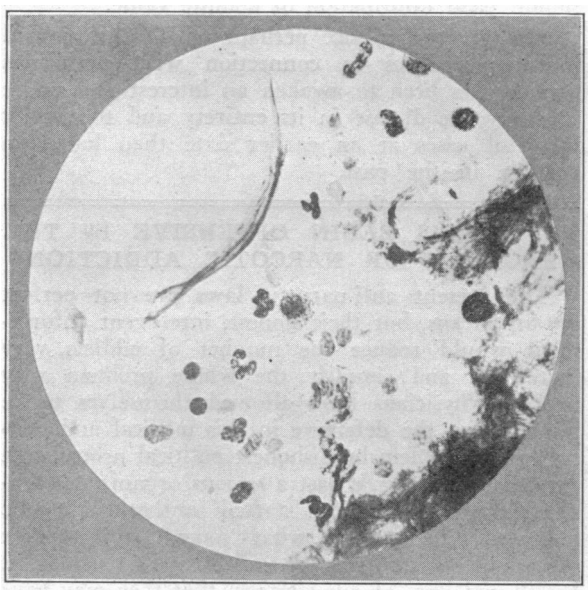
In our experiments we have always selected the tibia for the purpose of puncture on account of its accessibility. The site usually chosen is about the juncture of the middle and upper third. The skin over this area is carefully sterilized with tincture of iodine and alcohol, and 2 per cent novocain used to accomplish local anaesthesia both of skin and underlying periosteum. The skin incision need not be over 1 cm. in length, being careful to divide the periosteum underneath. Only moderate pressure is used to force the drill down as it is penetrating the cortex of the bone. As it works its way down through the bone the drill usually becomes heated and cauterizes the puncture. The technique concerning a sterile field and asepsis should be impeccable. As soon as the cortex is pierced and the drill removed with the casing in situ, the small screw-like instrument is carefully passed down the casing to the marrow. After several turns it is lifted out and the marrow smeared on sterile cover slips attempting to secure a thin, uniform distribution on the cover slip. These smears are dropped into absolute methyl alcohol for fixation and are stained with the May-Grünwald stain, counterstained with Giesma's stain for good cell differentiation. Wright's stain may be used, but does not seem to be quite as satisfactory as the above method.

INTREPRETATION OF BONE MARROW SMEARS

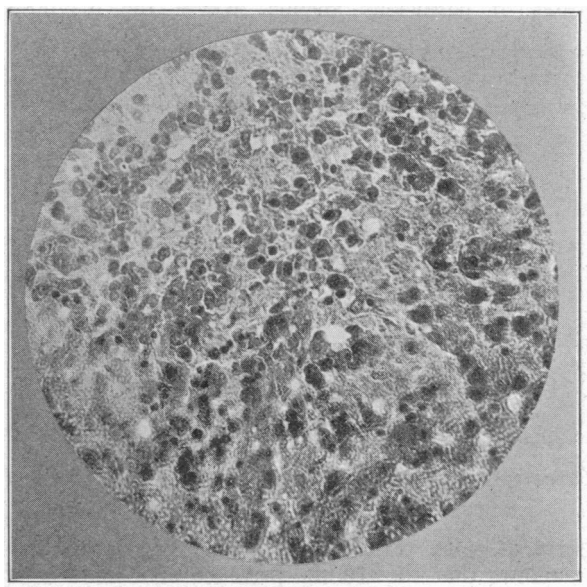
After one has secured a bone marrow smear and prepared it the interpretation of the specimen is fraught with considerable difficulty. It will be evident to any one familiar with blood work that several smears must be studied. In the leukemias the marrow smears are not so difficult to interpret as the marrow is very cellular and the type of cell is suggestive of the condition. In pernicious anemia the interpretation is far more difficult and a discussion of this problem involves a consideration of the accepted ideas of bone marrow pathology in this disease. The viewpoint put forward by Ehrlich in 1898 that pernicious anemia is a primary disease of the bone marrow, a "megaloblastic degeneration," i. e., a degenerative change in which the marrow reverts to its embryonic type of red cell production, has not been fully supported by clinical observation and experimental evidence.

* Read before the Section on General Medicine of the Medical Society of California at Yosemite National Park, May 16, 1922.

Megaloblasts and macrocytes have been found in the blood and in the marrow in other conditions, i. e., other types of anemia and the condition has been reproduced experimentally in animals by Bunting, with hemolytic toxins; for example, ricin. It would appear, therefore, that the changes in the marrow in pernicious anemia are secondary and represent an effort to compensate blood destruction rather than the marrow being the primary site of a disease which is characterized by faulty blood regeneration. If marrow changes are secondary and represent "broken compensation" from overwork how will the marrow in progressive pernicious anemia differ from that of other severe anemias. As a matter of fact the widely prevalent idea that the marrow in this disease is always a red marrow is very probably incorrect. Also there are undoubtedly severe chronic anemias where the marrow, at first very active, later becomes exhausted, and is indistinguishable from that found in pernicious anemia. The degree of hemolysis



Cut 1
This marrow smear is diluted with normal Saline solution and cells are sparsely distributed



Cut 2
Microtome section of marrow from patient where splenectomy was performed

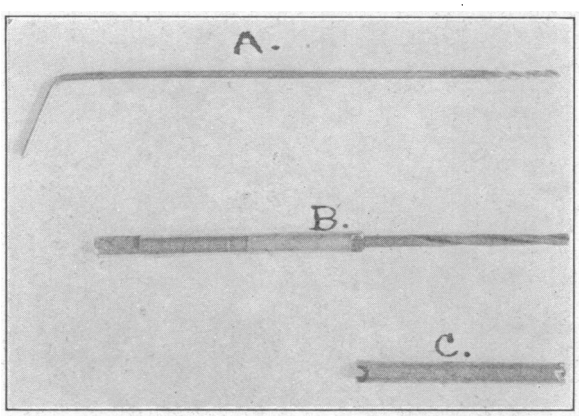
probably determines to some extent the formation of red marrow in pernicious anemia. For example, there is a type of case called attention to by Minot in Oxford Medicine where the disease comes on late in life and the toxic manifestations are chiefly apparent in the nervous system as a postero-lateral sclerosis of the spinal cord. Following is a brief synopsis of such a case. F. C., a male, entered the University of California Hospital first in 1918 aet. 59. Complaints: Weakness, numbness and tingling of hands and feet, diarrhoea, dizziness and "creepy" sensations. Examination showed: Tongue red, smooth; abdomen, slightly distended and sensitive to palpation; superficial reflexes exaggerated, especially knee jerks; gait, ataxic and spastic; Rhomberg present; Wassermann negative; spinal fluid negative. Gastric analysis showed no free HCL. Stool examination negative for parasites. Duodenal contents showed no urobilinogen; urobilin present in four dilutions, giving 800. Hbg. 45 per cent; red cells 2,100,000; white cells 7200; differential polymorphs 71; lymphocytes 24; eosinophyles 5 per cent.

Since this admission date the patient has entered the University of California Hospital four times, each time apparently in a relapse. After rest in bed in the hospital with one or two transfusions his red cells and hemoglobin rise, his symptoms improve and he leaves the hospital. On his last entry, November, 1921, marrow puncture was performed, and while his marrow was not definitely yellow, it certainly was not cellular. We have examined the marrow of three other cases almost identical in type with the above case and the marrow in each case was not cellular and did not impress us as being an active marrow. It would seem in these cases as if blood destruction is never very marked, nor on the other hand, is marrow activity, especially of the long bones, ever very marked. The toxins that cause the combined sclerosis of the cord depress the marrow activity and we get a sluggish marrow. According to Minot in Oxford Medicine, these cases die of their cord changes, rather than their anemia.

Contrast this type of case with the following case: H. B., a male aet. 46, dates his symptoms back to August, 1920, when he noted a yellowish tint to his skin. He also noted dyspnoea, palpitation weakness. During October, 1920, he became so weak that he could not walk so he entered the San Francisco Hospital. In one month he was discharged much improved and he returned to rather hard physical labor. He remained well up to April, 1921, when he again ceased work on account of weakness. On May 27, 1921, he again entered the San Francisco Hospital. At this time he complained of yellow color of skin, weakness, numbness and tingling of hands and feet, abdominal pains and distension, sore mouth and tongue. Examination showed a weak, apathetic man with lemon yellow tint to skin. Tongue smooth and red. A blowing systolic murmur over apex and base of heart; spleen and liver edge

palpable; patellars hyperactive. Urine shows urobilin present. Gastric contents show no free HCL. Stool examination negative for intestinal parasites. Wassermann negative. Blood examination: hbg. 20; red cells 864,000; white cells 2000; differential polymorphs 60; small mononuclears 25; large mononuclears 15 per cent; Smear shows macrocytes, microcytes, poikilocytes, a few normoblasts. Reticulated red cells 4 per cent. Fragility of the corpuscles .45-.38. Shortly after entering hospital a marrow puncture was performed showing a red marrow, very cellular, with evidence of activity—see cut of bone marrow smear No. 1. Many of the cells showed mitotic figures and also what we considered might be direct division by splitting up of nuclei. This patient left the hospital in July after two transfusions feeling very well. He returned to rather heavy physical labor. Shortly after leaving the hospital he was married.

We have performed marrow puncture in seven cases of pernicious anemia, where the diagnosis



Showing actual size of drill and instrument for reaming out the marrow

seemed quite certain and there were only two marrows that showed the presence of a number of cells containing mitotic figures in the nuclei. The other case is that of a young woman with marked evidence of hemolysis, but very little evidence of blood regeneration, as judged from a study of the peripheral blood. She showed on examination of the marrow a moderate number of cells scattered through the smear. We considered her marrow to be hyperplastic. About two weeks after marrow puncture she was subjected to removal of the spleen. Cut No. 2 shows a section of the marrow obtained at autopsy, as she only survived the splenectomy about three weeks. This section shows what appears to be considerable cellular activity in the marrow of the tibia following splenectomy. Two transfusions before splenectomy were apparently without avail in stimulating the marrow of the long bones.

The majority of the cases, diagnosed as pernicious anemia, and in which marrow puncture has been performed by us, have yielded a marrow showing very few signs of activity as judged by number, uniform distribution of cells and presence of diversified types of cells with amitotic and mitotic divisions of nuclea. This has been due in part at least to the fact that we have been dealing, for the most part, with cases of long duration where the marrow has been practically exhausted. It seemed best, for reasons which are obvious, to begin our work with cases of this type. The data here presented is fragmentary and can not be used for critical analysis, our purpose in this paper being to present a method which we believe can be used to advantage in the study of pernicious anemia. Our basis for such belief is that we feel, in order to give intelligent prognosis in primary anemia, it is necessary to balance the degree of blood destruction against the degree of blood regeneration, as evidenced by direct study of the marrow, rather than by study of the peripheral blood alone. The method also enables one to study the effects of agents thought to be marrow stimulants. Such studies are now under way with reference to the effects of different dosages of X-Ray on the marrow. The histological study of the marrow during different phases of the disease should yield information of definite value.

The greatest service perhaps which the method has rendered us in connection with pernicious anemia, has been to awaken an interest and desire to study the disease in its entirety and to classify doubtful cases at an earlier date than has been possible in the past.

PHYSICIANS BEGIN OFFENSIVE IN THE PROBLEM OF NARCOTIC ADDICTION

The present anti-narcotic laws are not perfect by any means, but their honest, intelligent enforcement would reduce the number of addicts very materially and simplify the whole problem very much. Physicians have allowed themselves to be placed upon the defensive in this medical and public health problem by dishonest political propaganda for a long time. At last a serious organized offensive movement has been started so that the public may be informed of what some administrative officers of our government will do with the morals, health and lives of our citizens, that they may have political control of an important part of the underworld and at the same time, in some instances at least, seeure profit to themselves.

The House of Delegates of the American Medical Association, in convention assembled, on May 23, 1922, adopted the following resolution on narcotic addiction:

"Resolved, That the House of Delegates of the American Medical Association approve House Resolution No. 258 (House of Representatives, Washington, D. C.), providing for a select committee of fifteen to inquire into the subject of narcotic conditions in the United States, the personnel of the Congressional committee to include all physicians who are now members of the House of Representatives."

House Resolution Number 258, referred to in the A. M. A. resolution, was introduced by Congressman (Doctor) Lester D. Volk. It calls for the appointment of a special committee, consisting of the fifteen physician members of Congress, to investigate the narcotic evil. This resolution, which has been endorsed by a number of National and State organizations, is a fearless exposé of some of the disgraceful methods employed in the administration of present laws, both by State and Federal